

TC8 - ELECTRONIC LIGHTING  
CONTROL EQUIPMENT.  
PROVISIONAL OPERATING INSTRUCTIONS.

## HANDBOOK



**THORN ELECTRONICS LTD**  
NEW MALDEN, SURREY,  
ENGLAND.

## 1.4 OPERATING INSTRUCTIONS

These Operating Instructions are intended to describe the operation of the equipment and state how the basic functions are achieved. They are meant to be read in conjunction with the block and other diagrams. In view of the almost limitless possibilities of lighting effects that can be achieved with this equipment, the finer points of operation have not been included except by way of a few specific examples. With a little practice the lighting director/operator will be able to achieve complex effects using combinations of the functions which are described.

1.4.1 DEFINITIONS - See Block Diagram Fig 1 and panel layout drawings.

### 1. Lighting Plot

A set of information defining the lamps in use and state of fade for each control channel, e.g., a channel plotted as 'On' at position 7 will give a dimmer output appropriate to that setting. A channel defined as 'Off' at a given fader setting will give no output and no light, but if turned ON by a channel control switch it will come 'On' at the pre-determined position.

Each plot will usually relate to a scene in the performance and to a set or group of sets.

A plot is "composed" using the Channel Controllers and Output or Preset Store, as may be most convenient, adjusting each required dimmer in turn. The result will normally be stored in a File for subsequent use. Other Filed plots may be combined and modified to produce new plots.

### 2. Magnetic Memory

All lighting plots are held for immediate and future use in a magnetic core store. Operationally, it is sub-divided into three parts.

#### (a) Output Store

A part of the magnetic memory where the plot is held while controlling the dimmers.

#### (b) Preset Store

A part of the magnetic memory where a plot may be set up and adjusted without necessarily affecting the state of the dimmers. If Mix Stores is 'On' then this independence no longer applies and both Output and Preset Stores will drive the Dimmers under the control of their respective Master Faders.

#### (c) File

A part of the main magnetic memory where up to 100 individual lighting plots can be stored and isolated. Channel level information is stored in a File to the nearest  $\frac{1}{2}$  division as indicated on the level meters (20 steps). Attempt to file a level which is set more accurately will always result in the storage to the nearest step.

3. Channel Control Panel (see Layout Drawings)

This enables an individual channel to be selected and controlled. This control may take place in either Output or Preset Store. The controller consists of the following sections:-

(a) Store Selector

This determines whether the selected channel is controlled in the Output or Preset Store.

(b) Channel Selector

These are decimal-coded push-buttons which select the channel to be modified.

(c) On/Off

This enables the selected channel to be modified by switching it 'On' or 'Off' and indicates the state of the channel at all times.

(d) Level Controls

These enable the level of the selected channel to be changed to a new level. The level of the selected channel is indicated on the meter at all times.

4. Channel Mimic

This indicates the channels in use in each store. Indicators used for the channels in the Output Store are driven from the Dimmers and therefore their intensities approximately correspond to that of the lamps in use. The channels for the Preset Store are indicated only if the channel is selected in the Preset Store and is shown at a constant brightness.

5. Master Control Panel (see Layout Drawings)

These controls affect all channels or a specific group of channels in a similar way. They are sub-divided into five parts:-

(a) File Selector

These are decimal-coded push-buttons which enable a file to be selected. Selection of a file does not cause that file to be used until one of the file controller buttons has been operated. When SEQ is 'On' the selected file will automatically switch in sequence to the next higher file after the operation of the file controller.

(b) File Controller

This either causes the lighting plot to be stored in the selected file or brings the selected file into use in the required store. It may be brought into use in any of the following ways:-

(i) Cut

This replaces the existing lighting plot with that in the selected file.

(ii) Plus or Add

This adds all the channels which are 'On' in the selected File at their new levels. Example:  
a circuit 'On' at 5 in the Output Store will change to 'On'

at 7 if the channel is plotted at 'On' at 7 in the File, or to 'On' at 3 if the channel is filed at 'On' at 3. The store will not change if the channel is plotted at 'Off' in the File whatever the associated dimmer position.

(iii) Minus, Zero or Subtract

This removes channels which are 'On' in the selected file. If this action takes place in the Output Store then the lights are switched 'Off' immediately but if the action takes place in the Preset Store then the light may be faded out using cross-fade.

(c) Cross-Fade

This causes the lighting plot in the Output Store to change to that in the Preset Store. There is independent control of the start and duration of a fade-up and fade-down. The cross-fade may be used to change only those channels which are 'On' in the Preset Store (the remaining channels in the Output Store are unaffected) or to change completely to the lighting plot in the Preset Store, i.e. to fade out unselected channels. The latter is referred to as a true cross-fade, and require the use of REM. ZERO. AUTO CROSS-FADE gives a true cross-fade automatically. The time taken for a channel to fade is that set up on the speed control and is independent of the degree of fade. A fade from Full to Off takes place in 80 increments which is sufficient to make each increment imperceptible. Channels which are selected at the same level in both Output and Preset Store do not change their level during a fade.

(d) Master Faders

These provide a proportional change to the output level of all channels in the relevant store but when a lighting plot in the store is filed, the filed levels are those which would have occurred if the Master Fader had been at maximum; this is because the Master Fader controls the circuitry between the Store and the Dimmer Drive but not between the Store and the File, and therefore cannot affect the levels to be recorded.

(e) Store Reset

This is a facility primarily meant to help when composing plots. All the channels in a chosen store may be switched 'Off' without the levels being changed, and equally they may be set to a predetermined level to assist in setting the lamps; if both these operations are put into effect, all the channels will be set to the level set on the edge-type switch, and also switched to 'Off'. Each channel can then be switched 'On' individually as it is needed for setting on the studio floor.

6. File Mimics (see Layout Drawings)

These show all the files which contribute to each store. Use of the file controller will cause the appropriate number to be illuminated on the mimic. At the start of a Cross-Fade files which contribute to the Preset Store are indicated in the file mimic for the Output Store, in addition to the existing file indications. At the end of a true cross-fade the indication on the file mimic for the Output Store becomes the same as the file mimic for the Preset Store.

7. Mix

This enables the output of both stores to drive the dimmers. Where a channel is selected in both stores the output will be that of the higher intensity. (See Magnetic Memory - Preset Store).

8. Dimmer Drive

This takes the signal from the Output Store (and the Preset Store if Mix is in use), and derives a control voltage for each Dimmer.

9. Dimmers

These are thyristor units which convert a d.c. control voltage to an a.c. power output. For a given input they provide a fixed output voltage and therefore any load within the rating of the Dimmer may be used.

10. Aux. Faders and Signal Patch Panel (see Layout Drawings)

Any of the Auxiliary Faders can be connected to any channel to a maximum of 50, via the Signal Patch Panel. Any channel can be connected to any number of faders; in this case, the highest fader setting takes precedence. When a channel is driven from the Aux. Faders and also from the electronic control, the highest signal again takes precedence.

Because these faders and patch panel are connected directly to the Dimmer they are independent of the electronic control.

#### 1.4.2. PRINCIPLE OF OPERATION

##### General (see Layout Drawings)

The operating block diagram, Fig. 1. shows the basic control network of the Electronic Lighting System. Information is held in one of three stores in the Magnetic Memory, viz:

- (a) File, where complete lighting plots are held.
- (b) Output Store, where the lighting plot on the set is held.
- (c) Preset Store, where a 'blind' lighting plot is held.

Lighting plots in the files can be transferred into either of the two stores using the File Selector and File Controller. Conversely, lighting plots in the Output or Preset Stores can be filed. Action at the Channel Control Panel affects only the Output or Preset Stores - it cannot change filed information; this applies also to all the Fade and Reset controls.

Information that is in the Preset Store can be transferred to the Output Store via the Files or Cross-Fade circuit. During the fade the lighting plot in the Output Store changes to match the 'On' channels in the Preset Store. The plot in the Preset Store does not change.

All channels in either the Output Store or Preset Store may be simultaneously turned 'Off' or Set to a common level by using the Store Reset Controls.

The lamps in the Scene are normally driven from the Output Store via the Dimmer Drive and Dimmers, but when Mix Stores is operated both Stores contribute, the higher level taking precedence. Individual channels may be manually controlled using the Auxiliary Faders and Signal Patch Panel. The Output of the Signal Patch Panel directly controls the Dimmers but where a channel receives an output both from the Magnetic Memory and Patch Panel, the higher level takes precedence.

The File Mimics are driven from the File Selectors (in conjunction with the File Controller) and show the Files in use. The Channel Mimic is driven from the Dimmers and the Preset Store.

7

### 1.4.3. HOW TO OPERATE THE EQUIPMENT

#### 1. Switching ON

- (a) Switch power ON at equipment rack - 2 switches.
- (b) Switch "SYSTEM ON" to ON - key TOK1 - and remove key.
- (c) Switch "CONSOLE ON" to ON - key TOK1 - key may be removed in ON condition if required.
- (d) If it is required to clear the information in the files, operate "CLEAR FILE" key switch - key TOK1 - holding key against spring bias. This will cause the light in the "CLEAR FILE" push-button switch to illuminate. With the key still held in this position, the push-button switch should be depressed. The key should then be returned to its normal position and removed.
- (e) If it is required to read into the files or to modify them, a key TOK1 should be used to operate the "FILE" key switch. The key cannot be removed unless the file action is turned Off.
- (f) Check the following:-
  - (i) Mix Stores Off.
  - (ii) Master Faders at maximum, i.e. red lights not illuminated.
  - (iii) Auxiliary equipment (e.g. Auxiliary Faders, patch panels, electricians panels, etc) is correctly set.
- (g) Operate the master OFF switches for both Output and Preset Stores.

#### 2. Setting Up a Lighting Plot Using Channel Control Panel

- (a) Select the required store using the "Select Store" switch on a Channel Control Panel.
- (b) To switch all channels 'Off', operate the appropriate OFF switch on the Master Control Panel.
- (c) To give a general starting level to all channels, adjust the appropriate Set Level switch on the Master Control Panel to the required general starting level and operate the Master Set push-button.
- (d) Select the required channel ensuring that all three digits, are indicated, e.g. 007. Although it is not always necessary to use all three banks of selectors (for example, on going from 007 to 008 or from 126 to 226 only one button need be pressed), nevertheless, all three digits must indicate correctly.
- (e) Switch the channel ON.

The selected channel may be switched ON and OFF by successive operations of the On/Off switch, i.e. if a channel is 'Off', operating the switch will turn it 'On' or if the channel is 'On', operation of the switch will turn it 'Off'. Alternatively, if the On/Off switch is held down the On/Off action is then operated by the

8

units switch on the Channel Selector. In this case, the action takes place when the units switch is released, i.e. if all channels are 'Off' with 034 selected then pressing the On/Off switch will switch 'On' this channel. If the On/Off switch is maintained depressed and channels 035, 036, 038 are selected in turn, each of these channels will be switched 'On' at the existing pre-adjusted level.

(f) If necessary, adjust the level of the channel. Channel level can be adjusted either by using the biased Fader or the 'Set Level' switch and 'Set' push-button on the Channel Control Panel (in which case the channel is adjusted to the Set Level).

The Biased Fader fades the selected channel 'up' or 'down' at a rate determined by the position of the control, until it is released. These rates correspond to 30, 15, 7, 3 or 1 seconds for a complete fade. It will be seen that the further the fader lever is moved from its mid position, the more rapidly is the change completed.

The 'Set' push button must be depressed for sufficient length of time to enable the channel to reach the new level. If this switch is maintained in the depressed position it will operate on any selected channel when the 'units' button for that channel is released (similar to (e) above).

If a group of channels are 'Off' and it is required to switch this group of channels 'On' at a particular level then if one of these channels is selected and both the 'On/Off' switch and the 'Set' push button are depressed then this channel will be switched 'On' at the required level and subsequent selection of a new channel will be switched 'On' at the required level when the 'units' switch is released. This means that if two of the channels required are 130 and 140 it is not sufficient to only depress the 4 'tens' switch but the 0 in the 'units' switches must also be operated in order to initiate the On and the Set actions.

(g) Repeat (d), (e) and (f) for all required channels.

(h) A channel can be changed at any time by reselection and readjustment of level; it can also be switched ON or OFF at any time.

### 3. Filing a Lighting Plot

Using the controls on the Master Control Panel associated with the required Store, select a File (ensuring that both digits of the file number are indicated), and operate the FILE push-button. Even if MIX STORES is ON the channel selection and levels which are filed are only those of the appropriate store. This means that although the lighting plots in both stores may drive the dimmers simultaneously they are nevertheless filed separately.

The levels to which channels are filed are those which occur when the Master Fader is at maximum.

Once filed, information is only modified by operating "CLEAR FILE" on the keyswitch panel or by refiling a new plot in the same file. It must at all times be remembered that EVERY change made to a File - whether of a channel, or a group of channels or of the level settings - should be refiled, otherwise when next used it will be found to carry stale information only.

4. To Extract Information from a File

Using the controls on the Master Control Panel associated with the required Store, select the required file and operate the CUT, PLUS or MINUS or ZERO push-buttons as appropriate.

5. To Modify a File or Produce a Plot Based on Existing Files

Using the controls on the Master Control Panel associated with the required Store, CUT the File to be modified into an appropriate Store. This store may now be altered by

(a) Modifying selected channel(s) using the controls on the Channel Control Panel, or

(b) Selecting another File and using PLUS, MINUS or ZERO switches.

The new plot must be refiled whether in the original File or a new one.

6. To Fade

Fade controls modify channels in the Output Store (and hence the lighting plot) until they are the same as the channels which are On in the Preset Store. Since only channels that are On in the Preset Store are faded it is necessary, in order to fade out a circuit, that this circuit be switched On at Zero level in the Preset Store. When it is required to Cross-Fade completely to the lighting defined by the plot in the Preset Store, REM. ZERO may be used to turn ON at Zero all other lights ON in the Output Store. This ensures that all lights not included in the Preset Store plot will fade out and a true Cross-Fade will be accomplished when the Fade controls are used. REM. ZERO may be operated at any time, even during a Cross-Fade.

Fade Up and Fade Down are independently controllable, i.e. they can be run at different rates (adjustable during a fade), started independently and stopped and restarted at will. The fades may be stopped by either operating the appropriate switch or taking the speed control to the bottom limit of its travel. Channels can be modified during a fade by using the Master Controls or modifying individual channels at the Channel Control Panel.

Operation of the Auto Cross-Fade switch automatically produces a Rem. Zero and starts both the fade-up and fade-down; these fades taking place in times determined by the speed controls.

Subsequent operation of this switch stops both the fade-up and the fade-down. Once an Auto Cross-Fade has been started the fade may be temporarily stopped by operating the Auto Cross-Fade switch and then operating it again to restart the fade. With the Auto Cross-Fade On the fade-up and fade-down may be independently controlled by the Speed Faders and/or Fade-Up/Fade-Down switches.

The final level of the channels in the Output Store is that of the Preset Store as modified by the Preset Master Fader.

The final level of the studio lights, however, also depend on the setting of the output Master Fader.

On the completion of a fade, any channel which has been taken to Zero is automatically switched OFF.

If a channel is modified in the Output Store during a cross-fade

then that channel is automatically turned 'Off' in the Preset Store which prevents the channel cross-fading to a new level. This occurs whether the modification occurs by use of a Channel Control Panel or by use of a File. This means that any change which takes place directly in the Output Store over-rides a cross-fade.

### 1.4.3 CONTROLS AND INDICATORS

#### 1.4.3.1 GENERAL

The following is a list of the controls and indicators used in the system with a brief description of their function and illumination.

It will help in using this equipment to remember the general convention covering the colours of warning and signal lamps, thus:

BLUE shows that the part of the system concerned is in a passive state and is available for use.

WHITE refers to parts of the system concerned with lamps which are at that time in use in the studio irrespective of state of fade.

GREEN refers to the parts of the system concerned with channels which are in use in the Preset Store.

AMBER is used as a warning to the operator that an abnormal state exists, associated with that button, or that an operation has not been completed. (It will be helpful to carefully study Notes 1 and 2, after 2.2 and 2.6). Although in the case of House Lights switch, this colour will show only when they are ON and so warn all concerned to switch them OFF before the cameras are used.

RED always means beware, for the use of the button concerned can involve the abnormal operation of some other part of the system.

#### 1. Channel Control Panel (see Layout Drawings)

Three identical panels are fitted. They may be used independently or simultaneously and each can be used to modify a selected channel in either the Output or Preset Store. All the switches on a panel are illuminated white or green to indicate that the channel to be modified is in the Output or Preset Store respectively. If, by any chance more than one of the panels should be used simultaneously to control the same channel in the same store, then no harm will be done.

##### (a) Select Store

Alternate action push-buttons which select the Store (Preset or Output) in which the selected channel may be modified.

Colour - white when Output Store selected  
- green when Preset Store selected

##### (b) Channel Selectors

Decimal-coded momentary-action push-buttons for selecting required channel.

Colour - white or green depending on which store is selected.

The selected push-buttons are brighter.

12

(c) Channel On/Off - Black Circle Push-Button

4

Momentary-action push-button, alternate action switching the selected channel On or Off.

Colour - white or green depending on which store is selected, illuminated when the channel is On. The top left-hand undesignated lamp is connected in parallel with the push-button illumination.

(d) Set Level

Edge-type switch which predetermines the level to which the selected channel will be set by operation of the Set push-button (1(e)).

Colour - white

(e) Set

Momentary-action push-button which effects Set Level in the selected channel.

Colour - white for Output Store  
- green for Preset Store

(f) Level Control

Centre-biased fader for adjusting the level of the selected channel at a speed determined by the position of the control. The further the lever is displaced, the faster the channel will be faded. The speeds of the fade are equivalent to a full fade duration of 30, 15, 7, 3, 1 seconds.

(g) Level Indicator

Meter, calibrated 0-10 in 20 divisions which indicates the level of the selected channel. The background of the scale changes from black to white as the level changes from 0-10.

2. Master Control Panel (see Layout Drawings)

These controls affect all channels or selected groups of channels in a manner depending on the control which is operated. The indicators show the state of the board and modifications which may have taken place but would not otherwise be obvious.

2.1 Output Store File Selector

Decimal-coded momentary-action push-buttons for selecting the required file.

Colour - white. The selected push-buttons are brighter.

2.2 Output Store File Controller

(a) File

Momentary Action Push-Button which causes a selected file to record the information in the Output Store, replacing any previous content in the file concerned.

Colour - white unless File Key Switch is Off.

(b) Cut

Momentary-action push-button which replaces all information in the Output Store with that in the selected File.

Colour - white or amber  
(See Note 1)

(c) Plus

Momentary-action push-button which turns On at the new level all channels in the Output Store that are 'On' in the selected File. Channels that are already 'On' are changed to the new level.

Colour - white or amber  
(See Note 1)

(d) Minus

Momentary-action push -button which turns Off all channels in the Output Store that are recorded 'On' in the selected File without changing the channel level.

Colour - white or amber  
(See Note 1)

(e) Seq.

Alternate action push-button which sets up the next higher File when CUT, PLUS or MINUS is released.

Colour - red when effective  
- blue when non-effective

NOTE 1: Amber illumination of the Minus, Plus and Cut push-buttons indicates that at least one channel in the Output Store is in an unrecorded state, i.e. has been modified at the Channel Control Panel and the new information not filed. Caution is therefore required before operating CUT, PLUS or MINUS when they are amber.

2.3 Output File Mimic

Indicator on which are illuminated (white) all Files that are contributing to the information in the Output Store. The indication is the result of a CUT, PLUS, MINUS, FILE or FADE operation. On completion of a true crossfade, the Mimic is reset to the new File (s).

2.4 Output Store Modification Indicators

These show that the Output File Mimic may not be true or may be incomplete.

(a) Individual

Indicator which is illuminated when any channel in the Output Store is modified at the Channel Control Panel and not filed.

Colour - normally Off, but white when indicating.

141

(b) Minus

Indicator which is illuminated when the Output Stores information differs from that shown on the Output File Mimic by virtue of a MINUS operation.

Colour - normally Off, but white when indicating.

(c) Up, Down

Separate indicators which are illuminated when the Output Store information is not as displayed on the Output File Mimic by virtue of a Fade operation (Up or Down, as appropriate or Auto Cross-Fade).

Colour - normally Off, but white when indicating.

2.5 Preset Store File Selector

Decimal-coded momentary-action push-buttons for selecting the required File.

Colour - green. The selected push-buttons are brighter.

2.6 Preset Store File Controller

(a) File

Momentary Action Push-Button which causes a selected file to record the information in the Preset Store replacing any previous content in the file concerned.

Colour - green unless File Key Switch is Off.

(b) Cut

Momentary action push-button which replaces all information in the Preset Store with that in the selected File.

Colour - green or amber, but white or amber when Mix Stores is operated. (See Note 2)

(c) Plus

Momentary-action push-button which turns 'On' at the new level all channels in the Preset Store that are 'On' in the selected File. Channels that are already 'On' are changed to the new level.

Colour - Green or amber, but white or amber when Mix Stores is operated. (See Note 2)

(d) Zero

Momentary-action push-button which switches 'On' at Zero level' in the Preset Store all channels that are 'On' in the selected File.

Colour - Green or amber, but white or amber when Mix Stores is operated. (See Note 2)

(e) Seq.

Alternate action push-button which sets up the next higher File when CUT, PLUS or ZERO is released.

Colour - red when effective  
blue when non-effective

15

NOTE 2: Amber illumination of the Zero, Plus and Cut push-buttons indicates that at least one channel in the Preset Store is in an unrecorded state, i.e. has been modified at the Channel Control Panel and the new information not filed. Caution is therefore required before operating CUT, PLUS or ZERO when they are amber.

## 2.7 Preset File Mimic

Indicator on which are illuminated (green) all Files that are contributing to the information in the Preset Store. The indication is the result of a CUT, PLUS, ZERO, FILE operation.

## 2.8 Preset Store Modification Indicators

These show that the Preset File Mimic may not be true or may be incomplete.

### (a) Individual

Indicator which is illuminated when any channel in the Preset Store is modified at the Channel Control Panel and not filed.

Colour - normally Off, but green when indicating.

### (b) Zero

Indicator which is illuminated when the Preset Store information differs from that shown on the Preset File Mimic by virtue of a ZERO operation.

Colour - normally Off, but green when indicating.

### (c) Transfer

Indicator which is illuminated during a Fade when a channel is turned Off in the Preset Store by virtue of a modification to that channel in the Output Store.

Colour - normally Off, but green when indicating.

### (d) Rem. Zero

Indicator which is illuminated when the Preset Store is modified by a direct or indirect Rem. Zero operation. (See 1.4.3.2. (14))

Colour - normally Off, but green when indicating.

## 2.9 Master Faders

One control is fitted for the Output Store and one for the Preset Store. Each control varies the level of all channels in the appropriate store proportionally. The effect of the Master Faders is not filed, i.e. the contents of a Store are filed as though the Master Faders were at maximum. The Cross Fade changes the channel levels in the Output Store to those in the Preset Store as modified by the Preset Master Fade; remember that this is then subject to the Output Store Master Fader.

Scales and knobs are white for the Output Store Fader and green for the Preset Store Fader. The scales are marked to 0-10 in 20

15  
divisions. When either control is at a setting other than maximum a red light on the Fader is illuminated.

## 2.10 Mix Stores

Alternate action push-button which allows the Preset Store to control the Dimmers as well as the Output Store, the higher level on each channel taking precedence.

Colour - red when Stores are mixed  
- blue when Stores are unmixed

## 2.11 Cross-Fade Controls

### (a) Fade Up and Fade Down

These are momentary-action push-buttons which may be independently controlled, the alternate action switching the relevant fade ON or OFF. The Fade Up and Fade Down may also be started and stopped by the Auto Cross-Fade (See 2.11 (e)/ and Note 3). The push-buttons are marked with an arrow to indicate Fade Up or Fade Down. The duration of the fade is determined by speed controls (2.11 (b)). (See Note 3).

Colour - blue when fade is Off.  
white when fade is On.

These colours indicate the state of the relevant fade where it has been produced by operating the Fade Up or Fade Down or Auto Cross-Fade controls. This indication is not affected when the fade is stopped by speed controls (See 2.11 (b)).

### (b) Speed Controls

These are two faders, one controlling the duration of the Fade Up, the other of the Fade Down. They are situated above the relevant push-buttons. They are directly calibrated in seconds and the duration of a fade of any channel is determined by the setting of the speed control and is substantially independent of the degree of fade. They are calibrated 1-70 (seconds); when fully down - '00' - the fade is stopped. The rate of fade may be altered at any time, and may be stopped or started as required.

Colour - illumination white except when Fader is stopped by setting the speed control to '00' in this case the illumination is Off.

### (c) Travel Meters

Two meters, one for Fade Up and the other for Fade Down, which are calibrated 0-10 in 20 divisions. They indicate the proportion of the Fade (Up or Down as appropriate) which has been completed.

Colour - white

### (d) Rem. Zero

A momentary-action push-button which set to zero level and turns 'On', all channels which are 'Off' in the Preset Store and 'On' in the Output Store. They are therefore prepared for fading down when required and so permit a total cross-fade.

Colour - blue, turns green when true Rem. Zero is effected. Returns to blue if any channel becomes 'On' in the Output Store and 'Off' in the Preset Store, i.e. true Rem. Zero conditions no longer apply.

(e) Auto Cross-Fade

Alternate action push-button which replaces the lighting plot in the Output Store with that in the Preset Store at speeds (Up and Down) determined by the Speed Controls. Rem. Zero is automatically effected (see Rem. Zero, (2.11 (d)) see also Note 3)).

- Colour - blue when non-effective
- white when Fade-Up and Fade-Down are both being effected.
- amber when Auto Cross-Fade has been modified by stopping Fade-Up or Down on the push-buttons or the Speed Controls.

Note 3: Fade and Auto Cross-Fade switches are electronically interlocked so that whichever is last operated takes precedence.

2.12 Master Set Controls

(a) Set Level

Edge-type switches which predetermine the level to which all channels in the appropriate store will be set by operation of the Set push-button (2.12 (b)).

- Colour - white for Output Store
- green for Preset Store

(b) Set

Momentary action push-buttons which effect Set Level in the appropriate store: they have no effect on the channel On/Off states.

- Colour - white for Output Store
- green for Preset Store

(c) Off

Momentary-action push-buttons which turn 'Off' all channels in the appropriate Store: they have no effect on channel levels.

- Colour - white for Output Store
- green for Preset Store

3. Keyswitch Panel (See Layout Drawings)

Controls and Indicators

3.1 Scene Painting Lights

Keyswitch for illuminating special studio lights to enable work to proceed on the Studio Floor.

Key - TOK2 - removable in both On and Off positions.

18

### 3.2 House Lights

Four alternate action push-buttons to control House Lights.

Colour - amber when On.

### 3.3 Aux. Faders

Alternate action push-buttons which connects power to the Auxiliary Faders.

Colour - blue when Off but power is available for Faders.  
- white when power is switched to Faders.

For power to be available, the Auxiliary Faders Switch on the equipment rack must be On, together with the System On and Console On keyswitches.

### 3.4 Channel Mimic

Alternate action push-button which connects power to the Channel Mimic.

Colour - blue when Off but power is available for Channel Mimic.  
- white when power is switched to Channel Mimic.

For power to be available, the Control Switch on the equipment rack must be 'On', together with the System On and Console On keyswitches.

### 3.5 System On

Keyswitch which switches 'On' the control equipment and the File Mimic, and makes power available to the Console, Channel Mimic, Auxiliary Faders, File and Clear File keyswitches. When switched 'Off' all information, except that in the Files, is lost.

Key - TOK1 - removable in both On and Off positions.

### 3.6 Console On

Keyswitch which switches On the console and makes power available to the Auxiliary Faders, Channel Mimic, File and Clear File keyswitches. When switched Off the output from the control equipment to the dimmers is removed (subject to over-ride at the Electrician's Panel). No stored information is destroyed when the keyswitch is set Off.

Key - TOK1 - removable in both On and Off positions.

### 3.7 File

Keyswitch which, when Off, prevents filing action. Operative only when System On and Console On have been set On.

Key - TOK1 - removable in Off position only.

### 3.8 Clear File

Biased keyswitch and momentary-action push-button. When both keyswitch and push-button are operated, all information is destroyed in the files. Operative only when System On and Console On have been set On.

Key - TOK1 - removable in Off position only.

11

Colour - push-button illuminated red when keyswitch is operated.

4. Auxiliary Faders

(a) Two-Position Switch

This panel contains 10 Auxiliary Faders and a Switch that connects the Auxiliary Faders either to the Diode Plug Matrix on the equipment rack, or to 10 fixed channels (channels 230-239) for controlling camera head lamps. Where the same channel is used with an Auxiliary Fader, and provides an output from the electronic control system, the higher level takes precedence; where a channel is to be manually controlled it would be filed in the 'Off' state or below the minimum level likely to be met with, to avoid the manually determined level being over-ridden. This panel can be used independently of the electronic control system and therefore may be used in the event of the electronic system failing. For these faders to be operational the System On (3.5) and Console On (3.6) and Aux. Faders On (3.3). When the faders are operational the scales are illuminated. This illumination is white when the faders are controlling the fixed channels and red when switched to control channels via the Diode Plug Matrix.

(b) Diode Plug Matrix

When the 10 Auxiliary Faders are connected to this panel (situated on the equipment rack) each Fader can control any, or all, of the total complement of channels.

5. Mimic Diagrams

(a) Channel Mimic

Indicator on which all channels that are 'On' in either store is illuminated.

Colour - white for Output Store at an intensity proportional to each channel level.  
- green for Preset Store at a constant intensity.

(b) Studio Mimic

Indicator on which the position, and intensity of all Lamps on the Studio Floor is shown. This mimic includes four red lamps which are illuminated when the house lights are Off.

(c) File Mimics

(See 2.3 and 2.7).

6. Legends adjacent to Channel Mimic

(a) Lighting Power On

Lamp which indicates that the power to the dimmer racks is On.

(b) Control System On

Lamp which indicates that the power to the equipment rack is On.

(c) Earth Fault

Lamp which indicates an out of balance current in excess

2 amps between phase and neutral in the supply to specific groups of lamps.

(d) Overheating

Lamp which indicates that a dimmer rack is overheating or that a dimmer rack fan fuse has blown.

(e) Patch

Lamp which indicates that the Dead Patch switch on the power patch panel has been operated.

(f) Control Fault

Lamp which indicates that there is some fault in the system. Legend 6 (a) to 6 (f) is situated in the Control Room adjacent to the Channel Mimic Diagram. Legends 6 (a), 6 (c), 6 (d), and 6 (e) are also fitted to the Electrician's Panel and Patch Panel.

7. Power Patch Panel

The cord and socket Patch Panel enables the 5kW and 10kW dimmer channels to be connected to a flexible selection of studio lighting circuits. The cords on the horizontal table represent the dimmers, the fixed Jacks on the vertical panel represent the lighting circuits. The 10k W channels may be split into pairs of 5 kW channels by means of changeover switches and in this state appear as additional dimmer cords operating in pairs. 25 amp fuses are mounted on the Patch Panel to protect these sub circuits.

Jumper circuits are provided to allow 100% selection and can be considered merely as extension leads to reach from one end of the panel to the other.

The level of any dimmer may be found by plugging its cord into one of the fixed test sockets on the vertical panel, when the dimmer level will be indicated on the appropriate voltmeter.

The load connected to any studio lighting circuit can be measured by plugging one of the load test cords into the appropriate circuit fixed jack socket. A push button labelled 'Test' is provided to operate an internal contactor to feed a 25 amp supply to the test cord via an ammeter mounted above the studio jack panel.

Dead Patch push buttons are provided, and any one of these will operate in a reversing sustaining fashion to black out all the dimmer outputs during patching operations to prolong contact life.

The Patch Panel includes indication pilots and legends to show the state of the system as described elsewhere and a mimic transformer to provide a 0-24 volt AC feed for each studio lighting circuit to a mimic diagram mounted in the control room. The mimic diagram itself takes the form of a studio plan with each lighting outlet position represented by a 24 volt pilot lamp with suitable adjacent engraving. The pilot gives a proportionate indication of the dimmer level feeding the particular circuit.

8. Electrician's Panel

Outputs from the equipment rack are routed through the Electrician's Panel which enables the dimmers to be:-

- (a) Switched Off.
- (b) Switched On at a fixed level.
- (c) Connected to the Output of the equipment rack.

1.4.3.2 CONDITIONS GOVERNING CONTROL DESK INDICATORS

The following is a list of indicators which are situated on the Control Desk and change in illumination or colour as a result of the operation of a control, or automatically as a result of internal processing. Whereas the descriptions in 1.4.3.1 are in general terms, the following conditions show specifically the actions which cause a particular indication.

<u>Item</u>	<u>Indicator/Control Title</u>	<u>Indicated State</u>	<u>Indicator/Control Colour Change</u>	<u>Conditions</u>
1	Output File Mimic	OFF	to OFF	True Cross Fade Completion or Output CUT) (Note 1) or Output FILE) or Output SET or Output OFF
		ON	to WHITE	Output CUT) (Note 1) or Output FILE) or Output ADD or Output MINUS or Transfer from Preset File Mimic if fade in progress. (Note 2)
2	Preset File Mimic	OFF	to OFF	Preset CUT) (Note 1) or Preset FILE) or Preset SET or Preset OFF
		ON	to GREEN	Preset CUT) (Note 1) or Preset FILE) or Preset ADD or Preset ZERO

/Continued ...

<u>Item</u>	<u>Indicator/Control Title</u>	<u>Indicated State</u>	<u>Indicator/Control Colour Change</u>	<u>Conditions</u>
3	Output Individual Modification Annunciator	OFF	to OFF	Output File Mimic OFF
	Output Cut } Output Add } Output Minus }		to WHITE	
	Output Individual Modification Annunciator	ON	to WHITE	Modification to individual channel (s) in Output Store.
	Output Cut } Output Add } Output Minus }		to AMBER	
4	Output File	OFF ON	to OFF to WHITE	File key switch OFF File key switch ON
5	Output Sequential	OFF ON	to BLUE to RED	Output Sequential OFF Output Sequential ON
	Preset Individual Modification Annunciator	OFF	to OFF } to GREEN }	Preset File Mimic OFF if Mix Stores OFF
	Preset Individual Modification Annunciator	OFF	to OFF } to WHITE }	Preset File Mimic OFF if Mix Stores ON
	Preset Cut } Preset Add } Preset Zero }			
	Preset Cut } Preset Add } Preset Zero }			

/Continued ...

<u>Item</u>	<u>Indicator/Control Title</u>	<u>Indicated State</u>	<u>Indicator/Control Colour Change</u>	<u>Conditions</u>
6	Preset Individual Modification Annunciator Preset Cut } Preset Add } Preset Zero }	ON	to GREEN	Individual modification to channel in Preset Store.
			to AMBER	
7	Preset File	OFF	to OFF	File key switch OFF
		ON	to GREEN	File key switch ON
8	Preset Sequential	OFF	to BLUE	Preset Sequential OFF
		ON	to RED	Preset Sequential ON
9	Fade Up } Fade Down }	OFF	to BLUE	Self OFF or Auto Cross Fade OFF or Output CUT or Output OFF or Output SET
		ON	to WHITE	Self ON Auto Cross Fade ON
10	Auto Cross Fade	OFF	to BLUE	Auto Cross Fade OFF or Output CUT or Output OFF or Output SET
		ON	Blue to White	Auto Cross Fade ON if speed controls ON
		ON	Blue to Amber	Auto Transfer ON if a speed control OFF

/Continued ...

240

<u>Item</u>	<u>Indicator/Control Title</u>	<u>Indicated State</u>	<u>Indicator/Control Colour Change</u>	<u>Conditions</u>
10		ON	AMBER to WHITE	Up, down and speed controls ON after Auto Cross Fade ON
		ON	WHITE to AMBER	Up or Down or speed controls OFF
11	Up speed scale ) Down speed scale )	OFF ON	to OFF to WHITE	Self OFF Self ON
12	Travel meters	RESET TO ZERO		Output CUT or Output OFF or Output SET or PRESET CUT or PRESET ADD or PRESET ZERO or PRESET SET or Rem. Zero ON or PRESET IND. MOD.
13	Rem. Zero	OFF ON	to BLUE to GREEN	Not true REM. ZERO (Note 3) Self ON or Auto Cross Fade ON or Preset CUT if Auto Cross Fade ON

/Continued....



26

<u>Item</u>	<u>Indicator/Control Title</u>	<u>Indicated State</u>	<u>Indicator/Control Colour Change</u>	<u>Conditions</u>
19	Master Fader Indicators	OFF	OFF	Master Faders at maximum
		ON	to RED	Master Faders not at maximum
20	Mix Stores	OFF	to BLUE	Self OFF
		ON	to RED	Self ON
21	Clear File (see Note 4)	OFF	to OFF	System Clear Key Switch OFF
		ON	to RED	System Clear Key Switch ON
22	Auxiliary Faders (see Note 4)	OFF	to BLUE	"Auxiliary" Master Switch ON and System Key Switch ON and Console Key Switch ON and Self OFF
		ON	to WHITE	"Auxiliary" Master Switch ON and System Key Switch ON and Console Key Switch ON and Self ON
23	Channel Mimic (see Note 4)	OFF	to BLUE	"Control" Master Switch ON and System Key Switch ON and Console Key Switch ON and Self OFF
		ON	to WHITE	"Control master Switch ON and System Key Switch ON and Console Key Switch ON and Self ON

/Continued ...

NOTES

1. For actions which are shown as initiating both states of the indicator/push button the 'ON' state immediately follows the 'OFF' state.
2. The term 'fade' in this context is the general term applying to the Auto Cross Fade ON or the Up Fade ON or the Down Fade ON.
3. Returns to blue if any channel becomes 'ON' in the Output Store and 'Off' in the Preset Store.
4. Functions 21-23 are located on the low priority switch panel, all others being located on the master control panel. Functions 1-21 presuppose the conditions stated implicitly for functions 22, 23 that the Control Master Switch, the system Key Switch and the Console Key Switch are all ON.

FIRST  
USED ON  
DRAWING  
PART LIST  
Nº

DRG. Nº  
**A** 108213

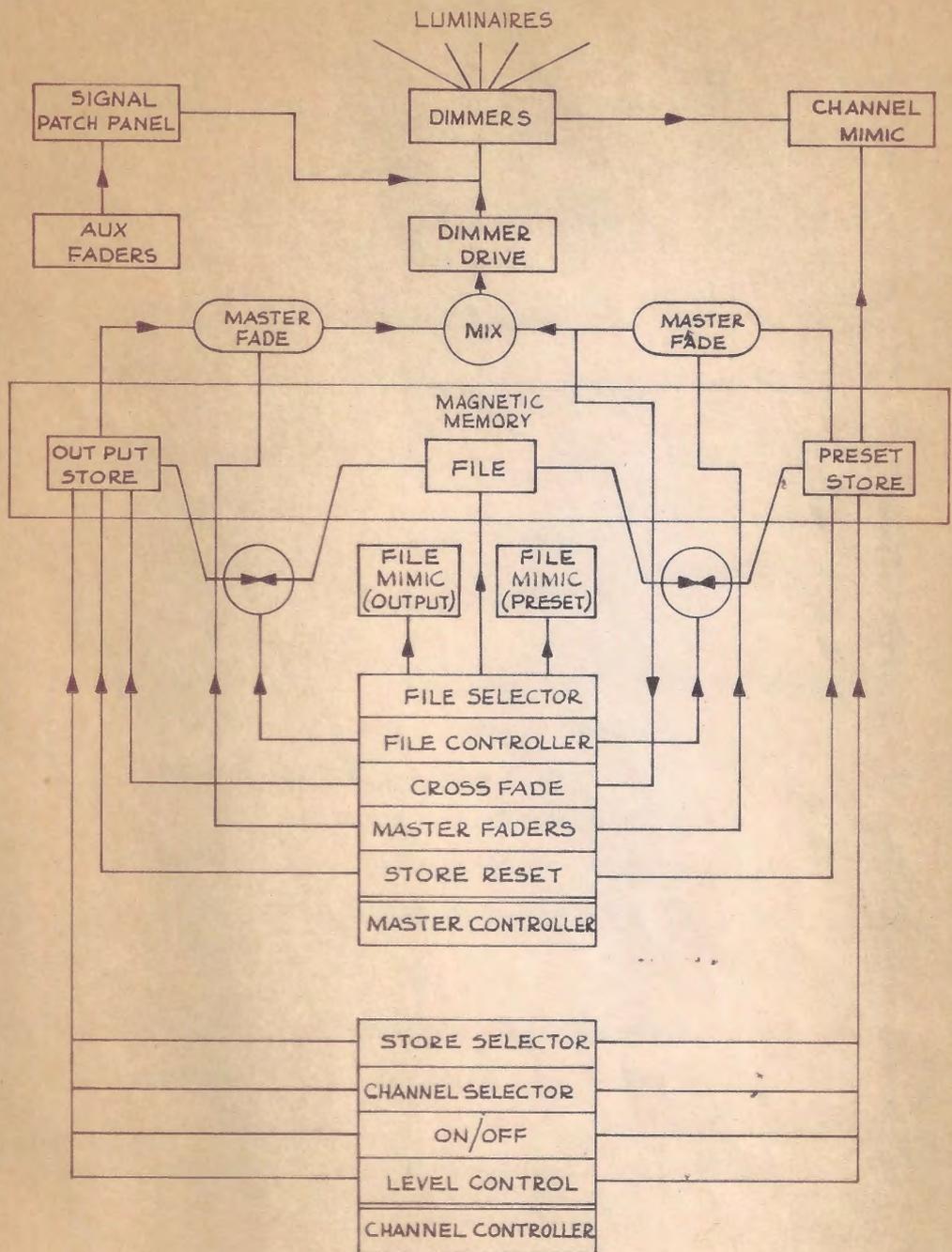


FIG. J. BLOCK SCHEMATIC

ISSUE	DATE	CH. Nº	DRN. B.J.G.	APPROVED
1	8-3-67		TR'CD.	
2	19-4-67		CH'K'D.	
3	11-7-67			

THORN ELECTRONICS LTD., ENFIELD, MIDDLESEX.

TITLE :-  
SCHEMATIC DIAGRAM  
OF OPERATION  
LIGHTING CONTROL

DRAWING Nº

**A** 108213

SPEC. SHEET

FILE MIMIC—OUTPUT      FILE MIMIC—PRESET

KEY SWITCH PANEL

COMMUNICATIONS PANEL

OUTPUT STORE ANNUNCIATOR

PRESET STORE ANNUNCIATOR

MASTER FADE

MIX

FILE SELECTOR

FILE CONTROLLER

STORE RE-SET

CROSS-FADE

FILE SELECTOR

FILE CONTROLLER

STORE SELECTOR

ON INDICATOR

LEVEL CONTROL

ON OFF

CHANNEL SELECTOR PANEL

MASTER CONTROL PANEL